DEBT FINANCING OF LOCAL AUTHORITIES IN THE EU MEMBER COUNTRIES

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Abstract

The present paper is intended to study the debt financing of local authorities in the EU member countries for the period of 2013-2016. The empirical estimations have been done via OLS method on a simple regression model. Local debt is a dependent variable. Revenues from local taxes, local expenditures, local budgetary balance as well as the number of municipalities, average municipality's population and GDP per capita in a country are used as independent variables. The results confirm that local debt was really affected by local taxes, local expenditures and number of municipalities.

Keywords: local debt, local taxes, local budgetary balance, local expenditures, number of municipalities, average population and GDP per capita, regression analysis
JEL Codes: H62, H71, H72

INTRODUCTION

The activity of analyzing the indebtedness of local authorities has increased in recent years. The problems of municipal finance are increasingly becoming a focus of attention in many countries. For example, in EU countries, local authorities have more and more powers with the corresponding increase in the functions they perform and, as a result, higher levels of spending are being observed. This leads to high levels of indebtedness in most local administrations (Lopez-Hernandez et.al., 2012, pp. 631-645; Zafra-Gomez et al., 2013). Long-term funding helps to overcome time differences in revenue collection and spending and allows optimization of budget management (Vladimirova, Naidenov, 2011, p. 219). The reasonable use of debt instruments enables local government to actively manage the territorial reproduction process and the development of a municipal capital market is a prerequisite for efficient interregional capital movement, acceleration of the investment process in the

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municipality, infrastructure renewal, attraction of private financial resources to the municipal economic development (Stoilova, 2005).

This paper aims to check whether there is a link between changes in local tax revenue, the local budget balance, the number of municipalities, the average population in one municipality, GDP per capita - on the one hand, and local debt - on the other. The methodology of regression analysis is selected. The timeframe of the survey covers the period 2013-2016.

LITERATURE OVERVIEW

Literature examining the debt financing of local authorities in the EU is not particularly large, although some of the contributions are relevant. Studies between countries are practically non-existent, which creates some difficulties in reviewing international literature. Guillamón (2011) provides a summary of literature focusing on various aspects of municipal debt. Marija Teresa Balaguer-Coll, Diego Prior and Emily Tortosa-Ausina (2013) make a detailed overview of the existing evidence of the factors affecting the size of the local debt. Among the reviewed studies, there are several major country-specific surveys, namely those of Cropf and Wendel (1998) which deal with the practice of the UK, Ashworth (2005) and Bastiaens (2001), which analyze the Flemish municipalities or Baber and Gore (2008) that focus on local governments in the United States.

There are more sophisticated surveys on the state of local debt such as that of J. Ashworth, B. Geys and B. Heyndels (2005), in which government weakness is related to the development of local public debt in Flemish municipalities.

METHODOLOGY OF EMPIRICAL ANALYSIS, DATA AND SOURCES

This study an analysis the local tax revenues, the local budget balance, the number of municipalities, the average population in one municipality, GDP per capita - on the one hand, and local debt - on the other. In this way, information on the impact of the analyzed indicators on debt will be obtained. A multiple regression model has been built. Its specification is as follows:

(1) $$LD_{it} = c + b_1 LTR_{it} + b_2 LGE_{it} + b_3 LBB_{it} + b_4 NM_{it} + b_5 ANP_{it} + b_6 GDPpc_{it} + \varepsilon_{it}$$

Where: LD_{it} is local debt for each country and year, LTR_{it} are local revenue per country and year, LGE_{it} are local costs per country and year, LBB_{it} is the balance of the local budget for each country and year; NM_{it} is the number of municipalities per country and year, ANP_{it} is the average population per country and year, $GDPpc_{it}$ is gross domestic product per capita. The random component in the equation is ε_{it}, which is the deviation of the dependent variable deviation that is not explained by the factors included in the model. The regression equation parameters are c, b_1, b_2, b_3, b_4, b_5, b_6.

To find the regression coefficients is adopted the least squares method. The econometric software product "E-Views 7" was used. The information on the quantitative data on the values of the variables by years and countries is taken from the Eurostat database.

The computational procedure in the empirical analysis is based on a panel of annual data for the countries of the European Union. The regression equation parameters are calculated for the EU-28 countries using the smallest squares method.

DESCRIPTION OF THE SURVEY RESULTS

Table 1 presents the correlation coefficients between local debt, municipal revenues, municipal expenditures, the balance of the municipal budget, the number of municipalities, the average population of the municipality and the GDP in the EU-28.

Table 1. Correlation coefficients between analysed variables for EU-28 countries

	LD	REVENUE	EXPEN	DEFICIT	MUN	SREDNO	GDP
LD	1.000000	0.942277	0.957540	0.231436	0.797035	-0.046839	0.227232
REVENUE	0.942277	1.000000	0.912931	0.357158	0.789918	-0.146141	0.224136
EXPEND	0.957540	0.912931	1.000000	0.146637	0.628591	0.065220	0.264214
DEFICIT	0.231436	0.357158	0.146637	1.000000	0.349360	-0.358528	-0.081147
MUN	0.797035	0.789918	0.628591	0.349360	1.000000	-0.254419	0.069241
SREDNO	-0.046839	-0.146141	0.065220	-0.358528	-0.254419	1.000000	0.037540
GDP	0.227232	0.224136	0.264214	-0.081147	0.069241	0.037540	1.000000

Source: Author calculations based on Eurostat data

When the correlations between the variables included in the model are less than 0.2, then there are no serious consequences for the subsequently calculated regression results. Among the variables included in this model,

higher values of the calculated correlation coefficients are also observed. The correlation between local debt and municipal spending is the highest, followed by the correlation between local debt and local revenue. The lowest correlation is observed for GDP and the average population of the municipality. There is a correlation with the average number of municipalities and local debt, local incomes, the balance and the number of municipalities. This indicates that the calculated regression dependencies that are calculated in this model will not be free of multicollinearity.

Table 2. Parameters of the regression model with annual data

	Model 1	**Model 2**	**Model 3**
Constant	-1706.53	-1507.55	-1908.71
	(-1.34)	(-1.00)	(-0.93)
Local tax revenue^2	2.28E-06**	2.25E-06**	2.24E-06**
	(2.66)	(2.55)	(2.53)
Local costs	0.42***	0.42***	0.42***
	(17.47)	(16.55)	(16.10)
Local Budget Balance	-0.32	-0.35	-0.34
	(-0.63)	(-0.66)	(-0.63)
Number of municipalities in one country	1.64***	1.64***	1.64***
	(5.20)	(5.13)	(5.09)
Average population of the municipality		-0.01	-0.01
		(-0.26)	(-0.24)
GDP per capita			0.02
			(0.29)
R-squared	0.98	0.98	0.98
Adjusted R-squared	0.98	0.98	0.98
Durbin-Watson stat.	0.07	0.07	0.07
Akaike info criter.	20.69	20.73	20.76
Schwarz criterion	20.87	20.94	21.01
F-statistic	709.90	557.55	456.12
Prob(F-statistic)	0.00	0.00	0.00
Observations	56	56	56

Source: Author calculations based on Eurostat data

Note: result of t-test in brackets

*** Significant at level 1%; ** Significant at 5%; * Significant at 10%

Table 2 presents the parameters of the regression model with annual data. The high values of the R-squared can be explained by the fact that the variables included in the model explain almost entirely the variations in the annual values of the variables. Another explanation for the high coefficient of determination is the presence of a positive serial correlation. In all models, the Durbin-Watson values are positive and are significantly lower than the benchmark of 2.00.

The result obtained in the analysis of the impact of tax revenues does not support the postulates of theory and expectations of conventional economic logic. The coefficients are statistically significant for all regression models. The probability of error for the three models is between 5% and 10%. The result can be considered as reliable evidence because the level at which the coefficients are significant is between 5 and 10%. This means that the probability that the analyzed case will not lie on the regression line, i.e., not to be explained by it, which in essence means a misallocation error, does not exceed ten per cent.

In the course of examining local costs, the coefficients are statistically significant in all regression models, with t-test values being highest in the first model - 17.47, followed by the second model - 16.55 and the third model - 16.10. For all models the probability of error is less than 1%. The present results are consistent with those obtained from Brusca and Labrador (1998).

When analyzing the balance of the local budget, the results obtained are not significant in any of the models. The probability of error for all models is greater than 10%. This indicator is not significant and has no significant impact on the debt condition. In contrast to this result, some authors such as Benito and Bastida (2004) and Cabasés (2003) found a positive link between the balance of the local budget and the municipal debt.

The next parameter analyzed is the number of municipalities in one country. The number of local authorities is usually related to the size of the public sector. That is why the present study is at the beginning of the discussion on the attitude of the number of local authorities to the amount of debt. The odds are statistically significant in all models, with the probability of error being less than 1% and the result can be considered as reliable evidence.

The average population of the municipality is not a significant factor and has no significant impact on the state of the debt. The result obtained by the present study is consistent as far as an indication of an unclear and unsustainable attitude of the population to the indebtedness of local authorities is obtained.

The next indicator analyzed is GDP per capita. Regression coefficients are statistically insignificant. A positive link between GDP and municipal debt in Chinese municipalities was found in the Yanwui Wu study (2011).

CONCLUSION

The conclusions that we can make from the empirical analysis do not fully support standard economic expectations. The results confirm that local debt has indeed affected local taxes, local spending and the number of municipalities. When analyzing the balance of the local budget, the results obtained are not in line with those of other studies on the issues under consideration. The odds are not significant in any of the models. The coefficients obtained by examining the average population of the municipality, GDP per capita and the average population of the municipality are not statistically significant.

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